

The A2C2S: Extending Battle Command

Lieutenant Colonel Howard E. Arey, U.S. Army

THE U.S. ARMY Airborne Command and Control System (A2C2S) helicopter is another step in the evolutionary progress, from fixed, staffed headquarters at the rear of fielded forces to forward deployed command posts that place commanders at decisive points on the battlefield connecting them to their fighting forces through technology. The 4th Infantry Division (ID), the Army's first digital division, put this command and control (C2) platform into the hands of its commanders during counterinsurgency operations in Iraq's Sunni Triangle in 2003.

The division assessed the A2C2S's effectiveness in its current configuration; developed tactics, techniques, and procedures (TTPs) for its use; and recommended improvements. The A2C2S proved its value during combat operations, and the Army should implement recommendations that come from the 4th ID's experience.

The 4th ID's area of operations (AO) in Iraq was about the size of West Virginia. Task Force Ironhorse, composed of the division and its attached units, fought from Kirkuk in the north south to Baghdad's suburbs and from the Iranian border west for nearly 150 miles. Such a large AO challenged brigade combat teams (BCTs) as they planned raids and air assaults with enough tactical surprise to capture high-value targets and hidden weapons caches. In these missions, the A2C2S provided a communications capability and battlefield awareness the division could not achieve through traditional means.

What A2C2S Provides

The A2C2S helicopter has four single-channel ground and airborne radio systems; two multiband radios capable of operating on ultra-high frequency, very-high frequency, or frequency-modulated (FM) modes; and one voice/data satellite communications (SATCOM) radio, which can retransmit voice and data from any of the radio systems. Personnel op-

erating the system's five consoles can use the aircraft's high-frequency radio to talk over the horizon where SATCOM might not be available or appropriate.

The A2C2S's digital capabilities are equally robust. Each workstation can use any battlefield functional area (BFA) application: Maneuver Control System-Heavy (MCS-H); Maneuver Control System-Light (MCS-L); All-Source Analysis System (ASAS); Advanced Field Artillery Tactical Data System (AFATDS); Air Missile Defense System Work Station (AMDWS); Combat Service Support Control System (CSSCS); and Force XXI, Battle Command, Brigade and Below (FBCB2); and the Enhanced Position Location Reporting System (EPLRS). The A2C2S employs the EPLRS radio and Near-Term Digital Radio (NTDR) to keep the BFAs connected to both the upper and lower tactical internet. Also, a product manager add-on, Blue Force Tracker (BFT), provides an FBCB2-like capability that works through satellite transmissions instead of the division's ground-based EPLRS. The BFT provided 4th ID commanders a way to monitor nondivisional units that fielded BFT as they came into the theater.

Communications and situational awareness. While nothing can be totally flawless, the A2C2S provided the airborne commander better communications than any on the ground. The commander in the A2C2S was frequently the only one on the battlefield who had line-of-sight (LOS) capability and could talk to everybody. This nearly flawless voice communication capability was not the only benefit of operating from the A2C2S. The division's FBCB2 network depended on EPLRS transmitting via LOS to provide blue-force situational awareness. The A2C2S also enhanced the division's EPLRS connectivity and NTDR network, covering about 25,000 square miles and providing an aerial relay every time the commander flew over the division's AO.



A Blackhawk from the 1-106th Aviation Regiment, Illinois Army National Guard, flies past one of Saddam Hussein's former palaces in Tikrit.

US Army

Chasing Saddam

"I need you to fly for 18 hours," the commander said. But, in reality, there is no way a helicopter crew can fly for a continuous 18 hours. Faced with this dilemma when a quickly organized force arrived in western Iraq, the A2C2S master operator recommended that the crew deploy the A2C2S's multifunctional antenna and monitor operations in the Iraqi desert from the ground. In this case, the A2C2S was used as a

portable tactical CP, but it was better than a typical tactical CP because the A2C2S was able to get to its assigned location in just a few hours instead of the dozens it would have taken for a wheeled tactical CP. The target of these operations was Saddam Hussein, who could possibly be fleeing toward Jordan. A single aircrew and A2C2S master operator operated the aircraft for 2 days before returning to Tikrit.

Airborne commanders using the A2C2S were nearly certain to receive EPLRS connections. Even if they were not able to receive EPLRS or FM radio communication, they could quickly move to a new location to regain connectivity. A commander in a ground tactical command post (CP) who received poor signals might never regain communications.

Moving across the battlespace and disembarking. In a large AO, a single position above the battlefield might be insufficient for a commander. The A2C2S solves this problem by allowing the commander to move across the entire battlespace. Most 4th ID missions in Iraq focused on specific targets and objectives. But, if the division had deployed through Turkey, brigade commanders, assistant division commanders, and the commanding general would have had to span the battlefield to best provide leadership and battle command.

When division commander Major General Raymond Odierno inspected the battlespace, he was always accompanied by his A2C2S. Whether planned or because of battlefield developments, he could quickly fly to the battle; mount his tank, Bradley, or high-mobility, multipurpose, wheeled vehicle; and personally inspect the situation.

No Perfect Fit for Every Mission

The A2C2S is not the ideal airborne C2 platform for all missions. Its greatest limitation is a restricted flight profile during daytime operations. Because of the man-portable air defense threat in Iraq, the A2C2S can only circle the battlefield safely under cover of darkness. Of course, the aircraft never stays right over the battle; it maneuvers some distance away from the actual fight and remains within radio LOS.

Flight during daylight hours requires different tactics. Aircrews trying to circle the AO during the day often fly the aircraft too low to maintain digital situational awareness. To keep commanders within communication range and aircraft crews and passengers alive, A2C2S pilots must land on high ground. Landing the aircraft on a reverse slope or near the top of a ridge allows the commander to continue receiving the needed communications and situational awareness.

Digital awareness is not reality. No matter how good the communications or how many blue icons appear on his computer screen, the commander's view from the A2C2S is still not the real view of the battlefield. In this respect, the commander in the A2C2S is still as limited as commanders in tactical CPs. He can hear the fight, but he cannot see what his subordinates are doing. Even during night flights, the commander in the A2C2S cannot see out because blackout curtains cover the windows to ensure the glare from computer screens does not reveal the aircraft's position.

Blue-feed icons show where units are on the map, but this still does not enable the commander to fully appreciate the lay of the land where units are fighting. There will never be a true replacement for a commander's presence on the battlefield at the critical place and time. Therein lies the problem: where is the critical piece of terrain, and when is it really

critical? And, if a skilled commander can visualize the unfolding battlefield and select decisive terrain, can he afford to go there, if by doing so he will not be able to monitor the rest of the battle from his new location? Only the individual commander can make this decision. The common operating picture (COP) provided by the digital systems is just a picture, but it is a picture of the entire fight. Whether a commander gives that up so he can be at a critical location on the ground is his decision alone. As commanders become more familiar with current technology, they will better discern when to choose one view of the battlefield over another.

Critical times to be aloft. A2C2S helicopters are not resourced for continuous operations. Unlike an Air Force jet flying around the globe, there is generally no swapping of crews in the middle of the mission, and crews have physiological limitations. Flying more than 6 hours wearing night-vision goggles and enduring duty days longer than 14 to 16 hours lead to decreased concentration. Additional crews are not the answer. The general support (GS) aviation battalion only has enough crew chiefs to man each aircraft; there are no extras.

With the high Army aviation operating tempo in Iraq, nearly every flyable helicopter is flown every day. This limitation requires commanders to predict through staff analysis the critical times they must be airborne. Typically, commanders want to be in the

Key Performance Parameter	Block I (Threshold)	Block II (Threshold)	Objective
The A2C2S will be joint interoperable.	Critical IERs	Critical IERs	All IERs
The A2C2S will host designated battlefield automated systems from the Army Battle Command System.	AFATDS, AMDWS, ASAS, CSSCS, FBCB2, MCS	AFATDS, AMDWS, ASAS, CSSCS, FBCB2, MCS	AFATDS, AMDWS, ASAS, CSSCS, FBCB2, GCCS-A, MCS
Communications systems within the A2C2S will facilitate secure communications by using standard Army communication security devices.	Joint Operations	Joint Operations	Combined Operations
A2C2S equipment will not interfere with proper operation nor adversely affect the aircraft survivability equipment of the host platform.	UH60L	UH60L and UH60M	UH60L and UH60M

AFATDS – Advanced Field Artillery Tactical Data System
AMDWS – Air and Missile Defense Work Station
ASAS – All-Source Analysis System

CSSCS – Combat Service Support Control System
FBCB2 – Force XXI, Battle Command, Brigade and Below
GCCS-A – Global Command and Control System-Army

IER – information exchange requirement
MCS – maneuver control system

air when they begin an attack or arrive at decisive terrain. Preplanned raids at specific H-hours typified the 4th ID's operations in Iraq. Had the division fought a sustained offensive campaign, choosing these windows of support would have been more difficult.

Making the A2C2S Better

The answers to the following questions will help planners make A2C2S better:

□ What is the A2C2S supposed to provide? What did the Army expect from this system? What did testers and evaluators measure during the acquisition cycle? The 4th ID knew what it needed from the A2C2S, which is a better operational test than any tester or evaluator could design, but the Army makes milestone decisions based on whether the system fills a mission need, then determines if the system meets necessary operational requirements. To inform acquisition decisionmakers so they can make these decisions, evaluators must determine if new systems satisfy critical operational issues and criteria (COIC).

Many systems have detailed COIC, but the Army only wanted to know if the A2C2S was a highly mobile, self-contained airborne digital CP and if its equipment and operational reliability, availability, and maintainability (RAM) met user requirements. Simply, was the system effective and suitable?

The testing community asked some additional questions. How well does the A2C2S maintain situational awareness while traversing the battlefield? Can the A2C2S perform its intended mission in manmade and hostile environments? Does it possess sufficient logistics support to meet the commander's requirements? Is the A2C2S suitable for operators and maintainers?¹ Fortunately, these COIC are sufficiently subjective so commanders and soldiers can make judgments from the best vantage point available—combat operations.

□ Is the A2C2S a highly mobile and self-contained airborne CP? The A2C2S provided nearly all the capabilities of the 4th ID's tactical operations centers (TOCs). With radios and BFA software, such as the MCS-H, the A2C2S was a self-contained CP in all respects but one; it did not provide live feed from the division's unmanned aerial vehicles (UAVs).² The lack of UAV live-feed capability is the one way the A2C2S CP differed from its ground counterpart.

From the commanding general's movement across the division's AO to brigade commanders monitoring 60-mile air assault missions, the A2C2S provides

the maneuver commander an extraordinary capability to maintain situational awareness while moving across the battlefield.

□ Does A2C2S equipment meet technical requirements? Technical requirements are straightforward. Can the system "talk secure?" Do Army battle command systems work on it? Does it work with the aircraft survivability equipment? (See table.) However, the BFAs the Combined Arms Center identified as threshold requirements did not capture the commander's actual technical requirements on the ground in Iraq.

During combat, the most important BFAs were the FBCB2, MCS-H, and MCS-L. Brigade commanders already using FBCB2 in their combat vehicles wanted to track vehicle icons as they moved across the battlefield. Not once did a ground commander use AFATDS, CSSCS, ASAS, or AMDWS. The aviation battalion S3 used AMDWS to track Blackhawks in some air assaults, but only because the UH60s were not fitted with EPLRS, and there was no other way to "see" them on the COP. Commanders might have used AFATDS and perhaps even ASAS during a division-scale attack, but these systems were not deemed essential.

The test and evaluation team also wanted to know if the A2C2S could accomplish its mission in manmade and hostile environments. For a year in Iraq, the A2C2S clearly proved to be a viable C2 platform in a hostile environment where surface-to-air missiles destroyed many U.S. Army helicopters. This did not mean commanders could fly in this aircraft anytime, anywhere, but if aviation commanders applied appropriate risk-mitigation techniques, the A2C2S was as survivable as any other aircraft the division used.

□ Does A2C2S's operational RAM meet user requirements? To help separate equipment failures from problems created by soldiers who did not know how to use the equipment, A2C2S's testers required the unit commander to certify that his soldiers were trained on the equipment and prepared to use it. When the 4th ID received its two preproduction A2C2S helicopters, the GS aviation battalion commander could not certify his soldiers. The two aircraft the product manager provided had different software and hardware than the demonstrator model on which division soldiers had practiced. Early mission failures bore this out: one air assault that was to be commanded from the A2C2S had to be commanded through a headset from the back of a "slick" UH60 because of an inability to properly operate the A2C2S.³

Stryker Brigade soldiers conduct a weapons search in Samarra, Iraq, 17 December 2003.



US Army

Ivy Blizzard

In the days after the capture of Saddam Hussein, the world wondered if Hussein loyalists in Iraq would continue fighting or lay down their arms. Those days were important to the 4th ID's Aviation Brigade for another reason: the GS aviation battalion was to provide two A2C2S aircraft to two separate brigades attacking the city of Samarra simultaneously. The division's 3d BCT, a nondigitized brigade that had received Blue Force Tracking for its deployment, attacked from the west. The 3d Brigade, 2d ID, the Army's first Stryker Brigade Combat Team, attacked from the east using its FBCB2-equipped Stryker vehicles. The aviation brigade was supporting two commanders fighting in the same area of operations—the first time it had ever done so. Even more remarkable, the 4th ID offered aircraft for the brigade commanders to lead from.

The operation began at night. Each commander monitored the fight and maintained communications between his tactical CP and fighting units and looked at the blue-force COP. This last point is probably of most importance; in no other division could two separate brigades (one attached for less than 2 weeks) have had real-time awareness of each other's forces.

The battle for Samarra lasted several days, during which each commander returned to his respective A2C2S as required to control his forces, thus demonstrating that using the system was a necessity. An aviation brigade commander later said the system could not be just as good as the ground commander's current CP, it had to be better. Two brigade commanders flying dozens of hours in the A2C2S is a sure sign that the A2C2S is truly better.

After the A2C2S master operators trained to operate the system, the division met the A2C2S RAM requirements. Of course, there were days when the aircraft was down like any other aircraft. This became a problem primarily because the battalion did not have airframes with the necessary antenna and wiring modifications to host A2C2S hardware. If the battalion had had these items, it could have swapped the A2C2S between airframes during maintenance, as is proposed for the "regular" fielding of A2C2S. The battalion was able to reduce this availability risk by planning ahead and preparing

the aircraft for important, planned missions.

□ Did the A2C2S fail to work during some missions? Yes, but as A2C2S operators became more proficient, they developed techniques to work around technical limitations. Soldiers were doing what they would do during any combat operation—work with what was available. Not having the luxury of declaring a system inoperative, canceling a test, or assessing a RAM failure, they did whatever was necessary to get the A2C2S working.

The issue of suitability becomes less clear with regard to logistics support. At this point, early in the

A 173d Airborne Brigade trooper provides overwatch during a weapons cache search near Kirkuk, Iraq, 22 November 2003.



US Army

The 173d Airborne Brigade on Hamrin Ridge

The 173d Airborne Brigade, 2/503d Infantry air assault raid was the first operation for the unit after a week of cancellations caused by fog and low cloud ceilings. Taking off from Kirkuk behind Apaches performing route and landing zone (LZ) reconnaissance, the A2C2S diverted to its perch atop Hamrin Ridge, allowing the infantry battalion commander and the aviation battalion S3 to monitor the operation.

After some weather-related delays, the mission finally began to unfold. Blue Force Tracking (BFT) icons indicated the 1-101st Attack Helicopter Battalion was working its way toward the LZ, followed by the Blackhawks. Instead of flying circles under the cover of darkness in an aviation-restricted operating zone, the aircraft parked 600 feet above the Tigris River on Hamrin Ridge, where its commander and staff could see nearly 20 miles back toward Kirkuk. The targeted village was clearly visible to the north-

east. Many soldiers on Hamrin Ridge said the view was similar to that from Tiefert Mountain at the National Training Center in California.

This attack was one of two the 1/503d Infantry Battalion fought that morning. To the southeast, a company was moving to capture other high-value targets. The battalion S3 watched the company's BFT icons on the screen and talked to its commander, while the battalion commander readied the main effort, an air assault. Each operation was independent of the other. The first sought to capture a target of opportunity the 173d Brigade commander had selected the night before. Without the A2C2S, the battalion commander and S3 would have had to separate and been unable to communicate with each other. With the A2C2S, the two officers sat side-by-side, talking to their companies at the same time, as they watched the attacks unfold.

A2C2S's life cycle, no established logistics support chain exists. Two contractors who lived with the aviation battalion were the link back to the product manager's support package in Kuwait and to the United States. While appropriate for preproduction and demonstrator models, maintaining the A2C2S through contracted support will be insufficient over the long term.

□ Is the A2C2S suitable for operators and maintainers? The answer depends on who the operators are. As originally envisioned by the Combined Arms Center, "Once the A2C2S arrives at the supported commander's location, the commander and/or his staff will quickly transition from a ground-based C2 environment to an airborne C2 environment."²⁴ This concept never worked. The complexity of A2C2S software and hardware required the

aviation battalion to create a master operator position from signal and aviation assets to configure and run the systems for the supported unit.

The noncommissioned officers (NCOs) in the A2C2S master operator section were subject matter experts adept in computer networking and the Army Battle Command Systems (ABCS) software. They were given the task of operating an untested system without training material or doctrine and were told to make it work while supporting combat operations. Only after the 4th Aviation Brigade created and filled master operator positions were ground maneuver commanders fully supported.

The original concept of supported unit soldiers operating the A2C2S systems looked good on paper, especially with an Operational Requirements Document (ORD) requirement stating, "[Fielding]

the system will not require the addition of personnel, military occupational specialties or additional skill identifiers (ASI). A2C2S operators are the same soldiers [who] operate identical Battlefield Automation Systems in ground CPs.”⁵

How combat commanders actually used the system created a different requirement, however. The Army’s most proficient BFA operators are junior enlisted soldiers and NCOs who have completed digital training courses and know how to operate MCS, AFATDS, and AMDWS software. The commander going into battle wants to be surrounded by his S3, executive officer (XO), fire support officer, and battle captains. Although these officers usually are not as proficient in ABCS software use as enlisted soldiers are, the A2C2S must be operating before the commander and staff board the helicopter. The maneuver commander does not want to adjust the software; he just wants to use it. When the aviation battalion recognized this, the master operator position came into existence.

The master operators eventually found the system suitable, keeping mission logs detailing the features commanders used most often. After over 1,000 combat flight hours operating the system, they made recommendations to improve the software and some hardware features. After a year of interaction between users, master operators, and the A2C2S logistical support team, the A2C2S became mostly suitable. But this process is never-ending. Many improvements in A2C2S software are relatively easy to implement, but hardware improvements are not.

□ Does it meet these COIC? The A2C2S provides commanders a highly maneuverable CP that extends the view of the battlespace well beyond traditional means. The system meets users’ technical requirements. If a digital system is available in a ground TOC, except for UAV live feeds, it is available in the A2C2S. If the A2C2S is flown tactically, given the enemy threat, the airborne commander can communicate with his subordinates anywhere on the battlefield.

□ Is the A2C2S suitable? There is no simple answer. Suitability can mean different things depending on your view of the problem. For the Blackhawk company commander, the answer is no. Like so many new systems, the A2C2S works well technically, but personnel and training requirements are not sufficient. Based on the 4th ID’s experiences, this aircraft cannot be expected to show up at a brigade TOC ready for the brigade staff to start operating it to its full capability. Majors and lieutenant colonels do not load overlays and change

software settings; enlisted soldiers do this work. Commanders and staffs do not gather information; they use it.

The A2C2S is highly effective because soldiers in wartime missions have overcome the system’s suitability shortcomings. This is not a permanent, long-term solution by any means. The creation of master operators out of signal battalion and aviation brigade authorized strength degrades these units. The A2C2S system is suitable, but not entirely so.

Fixing the A2C2S. While commanders at the highest levels (and civilian agencies such as the Federal Emergency Management Agency) will eventually use the A2C2S, the following recommendations focus on the division:

□ Put master operators on the modified table of organization and equipment. A requirement for master operators is the best way to make the A2C2S viable. Trained soldiers adept at operating the ABCS and the aircraft’s radios and networking features must undergo training in the digital technologies in Force XXI CPs. Soldiers from a ground brigade’s S3 section can operate the MCS, and signal soldiers from the S6 section can set up radios and networking, but the A2C2S crew cannot afford this luxury. Master operators must master all these technologies. These soldiers must be experts in all the BFAs in the A2C2S suite so when a commander boards the aircraft, he only needs to say, “Bring up the AFATDS,” or “Get my TOC on the radio.” Commanders will receive such seamless support only with resourced, trained soldiers who have ASIs or special qualification identifiers as proof of their additional training.

□ Get UAV live feed into the aircraft. The 4th ID’s commanders determined friendly force locations with FFCB2, BFT, and MCS. The next step is to get a UAV live feed into the A2C2S to provide commanders the same capability in the air as on the ground. Commanders obtain near-real-time awareness of friendly locations with the BFT and FFCB2, but only UAVs provide the real-time picture. Next to being on the ground, this is the best view of the battlefield a commander can have. Airborne commanders should also have the flight command authority to send UAVs wherever the ground commander needs them.

□ Air-condition the aft cabin. Air conditioning is often an unnecessary luxury, but based on the division’s experiences in Iraq, such an environmental control system is an absolute necessity for the A2C2S. With temperatures in the aft cabin exceeding 140 degrees in the summer months, commanders

could not remain there for the duration of extended operations. A2C2S operators sit near stacks of computer terminals and processors that also produce a large amount of heat. Cooling the aft cabin is crucial for computer reliability. Every commander who boarded the A2C2S in Iraq said the aft cabin required air conditioning.

□ Tailor ABCS applications. The ORD mandates a large number of applications, but BFA software applications should be reduced to a number that meets the warfighter's actual needs. Units do not conduct logistics planning in the aircraft, so there is no need for CSSCS. Whether AMDWS should stay in the A2C2S is debatable. The 4th ID's ground commanders never used it.

Some software additions are worth considering, however. After discussions with the aviation battalion S3, the master operators installed FalconView and learned to use NetMeeting to provide chat and whiteboard capabilities for the battalion during air assault operations. Adding the Tactical Airspace Integration System (TAIS) might be worthwhile. TAIS enables commanders to open air corridors when needed then close them to allow artillery and close-air support fires in high-intensity, linear battlefields with tight competition for limited airspace. TAIS was never necessary in Iraq, but not all lessons learned from the division's low- and mid-intensity operations are absolute. The requirement for TAIS might emerge on other battlefields.

How to better use the system. Even if the Army adopts these recommendations, the A2C2S will never be completely successful until supported units train on the system in garrison. The A2C2S is complex—not a system a commander should learn for the first time during combat. The 4th ID's brigade commanders evolved techniques for using the system that fit their leadership styles. There is no one way to best use the system.

The 2d BCT's XO was in the aircraft while its commander was forward on the ground. The 3d

BCT commander and his S3 often sat side-by-side in the A2C2S as they flew around the battlefield. Each method is appropriate and was learned through trial and error. The aviation battalion's master operators learned each brigade's TTPs. Using the A2C2S is, in essence, a battle drill requiring training to make its use as automatic as commanders need it to be.

Captains and majors must become experts in BFA software before using the A2C2S. Staff officers must be as adept on the digital systems as enlisted soldiers are, if not more so. The officer corps prides itself on technical and tactical proficiency. That proficiency must now extend beyond tanks and helicopters to information-superiority tools. While technical excellence on an MCS-L laptop might not seem as important as a perfect score in tank gunnery, a brigade S3 will probably use his MCS-L laptop much more than his main gun.

Use technology to extend the commander's reach. The A2C2S is now combat-proven. Dozens of the 4th ID's fights were better led because of A2C2S capabilities. The 4th ID's commanders could not afford to use an inferior system. The division already had excellent situational awareness from ground CPs. These commanders used the A2C2S because it allowed them to better command their units. No better tribute to the A2C2S exists than a commander and staff's vote of confidence.

The A2C2S can help free commanders from fixed staff headquarters. Commanders can now reach back for staff analysis and still be forward in the fight. Already a division-proven concept with Battle Command on the Move, the A2C2S further extends brigades' operational reach.⁶

The A2C2S is not perfect, but if it can meet commanders' demonstrated needs, it will be a welcome addition to the Army's current array of command posts. In the future, battle command doctrine will describe the TOC, the tactical CP, the rear CP—and the A2C2S. **MR**

NOTES

1. For critical operational issues and criteria, see the 20 March 2003 Test and Evaluation Master Plan.

2. The requirement for control of a tactical unmanned aerial vehicle was added as a Block II requirement for the Army Airborne Command and Control System (A2C2S) in the Operational Requirements Document (ORD), 3 April 2002.

3. The 1-8 Infantry Division (ID) commander was about to lead its first air assault since Vietnam from an A2C2S but moved to one of the UH60 assault aircraft during staging operations at Tikrit South Airfield.

4. The Combined Arms Center envisioned the commander's battle staff moving

to the A2C2S as an alternate tactical command post (CP) in the ORD's operational concept.

5. The "no additional manpower" requirement is from the "Human Systems Integration" section of the ORD. The term Battlefield Automation System is synonymous with the term battlefield functional area used in this article.

6. MG Raymond T. Odierno and LTC Edward J. Erickson's article, "The Battle for Taji and Battle Command on the Move," *Military Review* (July-August 2003): 2, details the 4th ID commander's use of Battle Command on the Move during the first weeks of the division's operations in Iraq.

Lieutenant Colonel Howard E. Arey, U.S. Army, is the S3 of the Aviation Brigade, 4th Infantry Division (Mechanized), Fort Hood, Texas. He received a B.S. from the U.S. Military Academy, an M.S. from East Carolina University, and is a graduate of the U.S. Air Command and Staff College. He has served in various command and staff positions in the continental United States and Germany.